BELL ENGINEERING
CIVIL & ENVIRONMENTAL

GROUNDWATER QUALITY ASSESSMENT

WEST BARNET GENERAL STORE
WEST BARNET, VT 99.2602

MAY 12 10 24 AM '99

1. General Site Information:

Site Name: West Barnet General Store, West Barnet, VT

UST Closure Date: 2-9-1999

Groundwater sampling date: 3-8-1999

UST's: Two (2) 500 gallon kerosene underground Storage Tanks

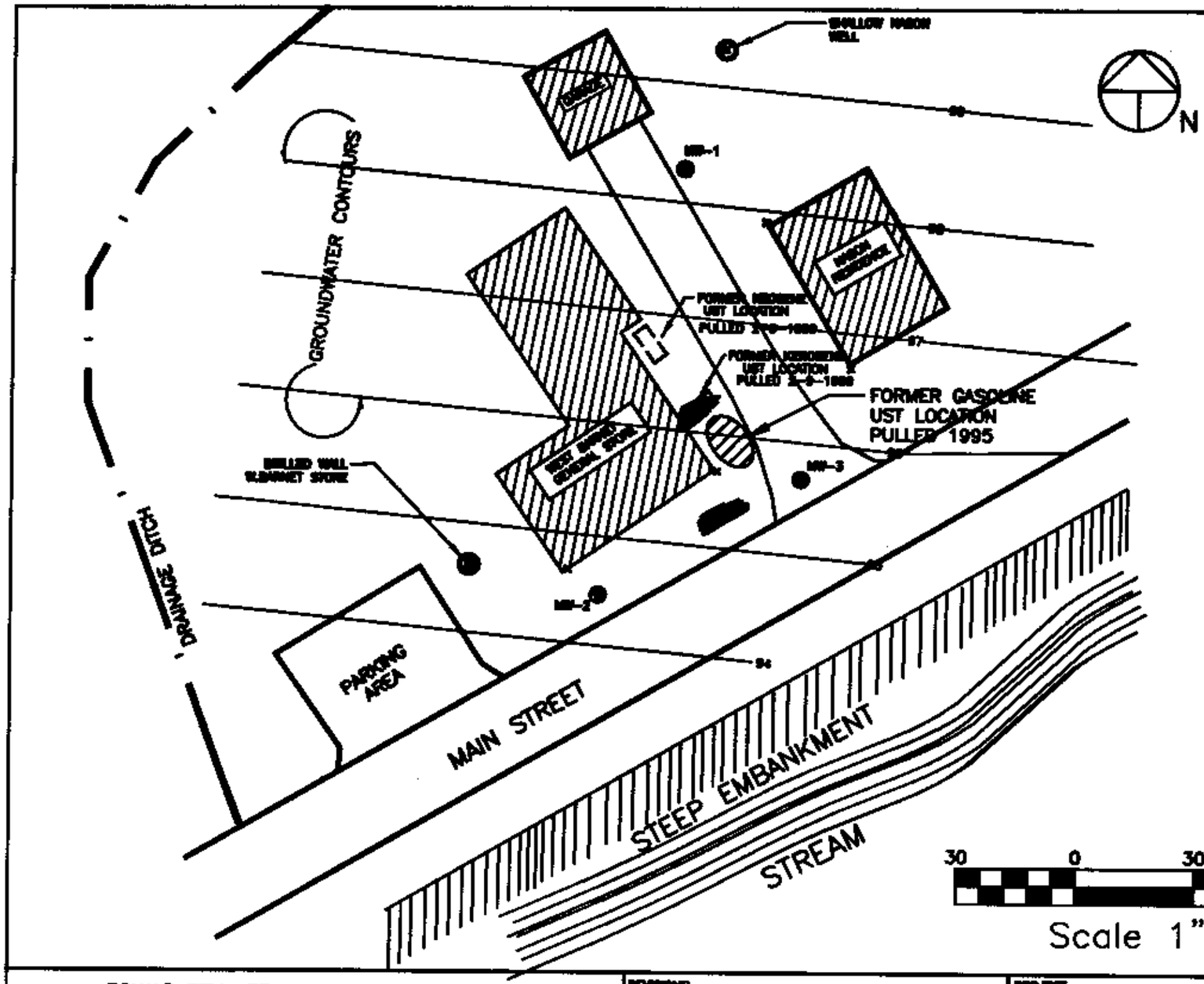
Owner: Mr. & Mrs. Ryan
West Barnet General Store
West Barnet, VT

Institution initiating Groundwater Monitoring Assessment:
The Merchants Bank
Burlington, Vermont

Consultant for the Merchants Bank:
Cay Consulting Company, Inc.
PO Box 2126
Brattleboro, VT 05303

UST Groundwater Monitoring Assessment Consultant:
Bell Engineering
72 School Street
Keene, NH 03431

Well drilling Contractor:
Adams Engineering
47 Blakey Road
Underhill, VT 05489-9493



GROUNDWATER MONITORING RESULTS 3-8-99 (ug/L)

SAMPLE LOCATION	BENZENE	TOLUENE	ETHYL BENZENE	1,3,5-TRIMETHYLBENZENE	1,2,4-TRIMETHYLBENZENE	XYLENES	NAPHTHALENE	MTBE	TPH
MASON WELL	(2.1)	ND	ND	ND	ND	ND	ND	ND	<1
W. BARNET STORE WELL	ND	ND	ND	ND	ND	ND	ND	ND	<1
MW-1	ND	ND	ND	ND	ND	ND	ND	ND	<1
MW-2	ND	ND	ND	ND	ND	ND	ND	ND	<1
MW-3	ND	ND	ND	ND	ND	ND	(52)	ND	<1

GROUNDWATER ELEVATION DATA

(TOP OF ROAD BOX AT MW-3 = 100.00')
(DATE OF GROUNDWATER ELEVATIONS = 3-8-1999)

MONITORING WELL	ELEVATION OF ROAD BOX	DEPTH TO GW	GW ELEVATION
MW-1	100.21'	1'-11"	98.25'
MW-2	99.40'	4'-11"	94.48'
MW-3	100.00'	4'-4"	95.67'

30 0 30 60 90

Scale 1" = 30'

BELL ENGINEERING
CIVIL & ENVIRONMENTAL
72 SCHOOL STREET PO BOX 1805
KEENE, NEW HAMPSHIRE 03431
(603) 355-3392

DRAWN BY: RONALD BELL, PE APPROVED BY:
DATE: Plot date: 04/12/99 at 21:02 PROJ. NO. 99-125
DWG. NO.: SN: 990412.21022116wg. File name: D:\PROJECTS\BARN\BARN

REVISIONS

PROJECT: WEST BARNET GENERAL STORE

SHT. NAME: FIGURE 1. GROUNDWATER MONITORING RESULTS

SHT. NO. 1

2.0 Introduction:

Two (2) 500 gallon UST's were pulled on March 8, 1999. The tank closure report is appended to this report. The UST identified as UST #1 was reported to be a kerosene tank. UST #2 was either used to store kerosene or fuel oil. Both tanks were in poor condition with holes present in the tanks. The soils in the excavation pits were found to be contaminated. A high reading of 25 ppm was observed in UST pit #1 and a high reading of 52 ppm was observed in UST pit #2. Due to the observed release of petroleum contaminates, 3 groundwater monitoring wells were subsequently installed to assess groundwater quality. Additionally, the well water at the subject property and the neighboring shallow well on the Nason property were sampled. The air quality in the basement of the West Barnet General Store was assessed.

In a previous gasoline UST removal which occurred in 1989, petroleum contamination was detected and contaminated soils were removed from the excavation and stockpiled, according to Ms. June Middleton of the VT Hazardous Materials Division. The site was subsequently removed from the VT Hazardous Waste Sites List. No groundwater monitoring wells were installed in this previous UST removal.

3.0 Site Plan:

A site Plan is presented in Figure 1. The site plan indicates: relative locations of the UST's which were pulled, neighboring properties, water supplies, surface water, groundwater monitoring wells, groundwater flow direction, and general surface features. Additionally, the groundwater analytical results and groundwater elevations at the groundwater monitoring wells are presented on the plan.

3. Results Groundwater Monitoring:

Groundwater samples were taken from MW-1, MW-2, MW-3, the drinking water well at the West Barnet General Store and form the Nason property located to the East of the subject property. The water samples were taken on [redacted] and dropped off on the same day at Green Mountain Laboratories, Inc. The groundwater samples were analyzed via EPA Method 8021B and 8100 Modified. A review of the groundwater analysis which is presented in figure 1. shows that MW-1, MW-2 and the water supply for the West Barnet General Store showed no VOC contamination to be present. The shallow well at the Nason property had a low level of Benzene present (3.1 ppm). MW-3 had a relatively low level of Naphthalene present (52 ppm). The groundwater enforcement standards for Benzene and Naphthalene are 5.0 ppm and 20 ppm respectively. The laboratory data is appended to this report.

4.0 Results of Soil Boring Screening:

During the construction of MW-1, MW-2 and MW-3, soil samples obtained from the continuous hollow sampling tube were screened with a PID which was calibrated just prior to use. The soils removed from the boreholes in MW-1 & MW-2 were found to be free of VOC contamination. Soils in the borehole of MW-3 were found to have low levels of VOCs present. PID readings of 1-3 ppm were present in the soils at depths of approximately 3 to 6 feet below grade. MW-3 is located adjacent to the former gasoline UST which was removed in 1989. In conversation with Ms. June Middleton of the Vermont Hazardous Materials Division, UST Program, it was learned that in the gasoline UST removal, contaminated soils were removed from the excavation and stockpiled. The West Barnet General Store had been on the State Hazardous Waste Sites List. The soils removed form the borehole of MW-3 had the odor of weathered gasoline.

The soils at the site are a silt loam with evidence of high seasonal water table (i.e., less than 4' bgs). The soils removed from the continuous sampling tube were generally very firm although the presence of stones made the soil profile somewhat inaccurate.

5.0 Hydrology:

The road box elevations of the monitoring wells were determined by surveying with a Total Station EDM. The depth to the groundwater was gauged. The groundwater elevation data is presented in Figure 1. The groundwater contours are plotted on Figure 1. A review of the groundwater contours shows that there is a very strong gradient to the south towards the South Peacham Brook. The shallow Nason well is located directly up gradient from the former UST area. The drilled well on the subject property is likely to be side gradient from a plume that may have originated from the UST area.

6.0 Basement Screening at the W. Barnet General Store:

The basement of the West Barnet General Store was screened with a Thermo Environmental Model 580 PID calibrated just prior to use. Particular attention was placed along side the east foundation adjacent to the former UST location. No VOC's were detected in the basement space.

7.0 Conclusions & Recommendations:

The deep drinking water well on the subject property and groundwater monitoring wells MW-1 and MW-2 were found to be free of VOC contamination.

Monitoring well MW-3 had relatively low levels of Naphthalene (52 ppm) which exceeds the groundwater enforcement standard of 20 ppm. MW-3 is in the general location of the former gasoline UST. Soil samples from MW-3 had the odor of weathered gasoline and low levels of VOC's were detected with a PID. Naphthalene is less volatile than the BTEX compounds and has a high affinity for absorption to soil particles and consequently

is one of the more persistent petroleum compounds in gasoline releases. Given that the source of the naphthalene is no longer present it is expected that the levels in MW-3 will continue to degrease with time. There are no sensitive receptors directly down gradient from the former UST location. Consequently, no active remediation is warranted. It is recommended that MW-3 be re-sampled at this time. If the additional sample is consistent in the contaminant level or the level of contaminates is below the enforcement standard then a request to the HMD to cease sampling would be made at that time. If during the additional sampling round, there are upward spikes in contaminate levels then it would be prudent to re-sample MW-3 on an annual basis until a clear trend in contaminate level is developed.

A low level of Benzene (3.1 ppm) was detected in the shallow overburden well located on the Nason property. the Nason well is located directly up gradient from the former UST location. The absence of contamination in MW-1 which is located between the former UST location and the shallow Nason well indicates that the contamination has occurred from a source other than the former UST's on the West Barnet General Store property. The strong groundwater gradient towards the south also indicates that the contamination in the Nason well occurred from some other source. The location of the Nason's garage less than 20 feet away from the shallow well where a car and lawn mover are stored which are possible sources of contamination. Although the benzene contaminate level is below the Groundwater Enforcement standard of 5.0 ppm and it appears that the former UST's on the subject property are not the likely source of the contamination, it is nonetheless recommended that a follow-up drinking water sample be taken from the Nason well and analyzed via EPA method 8020. It is recommended that this second round of samling of the Nason water supply be conducted in the immediate future and that the the information in this report be presented to the Nasons. The Nasons have been advised of the presence of Benzene in their water supply by Bell Engineering.

Appendix A

GROUNDWATER MONITORING DATA

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468 Fax (802) 223 - 8688

LABORATORY RESULTS

CLIENT NAME:	Bell Engineering	REFERENCE NO.:	4991
ADDRESS:	72 School Street	PROJECT NO.:	99-120
	Keene, NH 03431	DATE OF SAMPLE:	03/08/99
SAMPLE LOCATION:	West Barnet Store	DATE OF RECEIPT:	03/08/99
SAMPLER:	Ronald Bell	DATE OF ANALYSIS:	03/19/99
ATTENTION:	Ronald Bell	DATE OF REPORT:	03/22/99

Pertaining to the analyses of specimens submitted under the accompanying chain of custody form, please note the following:

- Water samples submitted for VOC analysis were preserved with HCl.
- Specimens were processed and examined according to the procedures outlined in the specified method.
- Holding times were honored.
- Instruments were appropriately tuned and calibrations were checked with the frequencies required in the specified method.
- Blank contamination was not observed at levels interfering with the analytical results.
- Continuing Calibration standards were monitored at intervals indicated in the specified method. The resulting analytical precision and accuracy were determined to be within method QA/QC acceptance limits.
- The efficiency of analyte recovery for individual samples was monitored by the addition of surrogate analyte to all samples, standards, and blanks. Surrogate recoveries were found to be within laboratory QA/QC acceptance limits, unless noted otherwise.

Reviewed by:

Sarah Hallock
Quality Assurance Officer

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468 Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - EPA 8260M

GML REF. # :	4991
STATION:	NASON
ANALYSIS DATE:	03/19/99
DATE SAMPLED:	03/08/99
SAMPLE TYPE:	WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	3.1
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 101 %

ND = Not Detected
BPQL = Below Practical Quantitation Limits

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468 Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - EPA 8260M

GML REF. # : 4991
STATION: STORE
ANALYSIS DATE: 03/19/99
DATE SAMPLED: 03/08/99
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 100 %

ND = Not Detected
BPQL = Below Practical Quantitation Limits

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468 Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - EPA 8260M

GML REF. # :	4991
STATION:	MW-1
ANALYSIS DATE:	03/19/99
DATE SAMPLED:	03/08/99
SAMPLE TYPE:	WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 100 %

ND = Not Detected
BPQL = Below Practical Quantitation Limits

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468 Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - EPA 8260M

GML REF. # : 4991
STATION: MW-2
ANALYSIS DATE: 03/19/99
DATE SAMPLED: 03/08/99
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 101 %

ND = Not Detected
BPQL = Below Practical Quantitation Limits

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223 - 1468 Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - EPA 8260M

GML REF. # :	4991
STATION:	MW-3
ANALYSIS DATE:	03/19/99
DATE SAMPLED:	03/08/99
SAMPLE TYPE:	WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	52 *
MTBE	5	ND

Surrogate % Recovery: 102 %

ND = Not Detected
BPQL = Below Practical Quantitation Limits

* A secondary analysis of the sample was performed to confirm the presence of this compound.

Green Mountain Laboratories, Inc.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223-1468 Fax (802) 223-8688

LABORATORY RESULTS

CLIENT NAME:	Bell Engineering	REF #:	4991
CLIENT ADDRESS:	72 School Street	PROJECT NO.:	99-120
	Keene, NH 03431	DATE OF SAMPLE:	03/08/99
PROJECT NAME:	West Barnet Store	DATE OF RECEIPT:	03/08/99
SAMPLER:	Ronald Bell	DATE OF ANALYSIS:	03/18/99
ATTENTION:	Ronald Bell	DATE OF REPORT:	03/26/99

Total Petroleum Hydrocarbons (TPH) by EPA Method 8100M (mg/L - ppm)

Sample	PQL	TPH Results
Nason	1.0	<1.0
Store	1.0	<1.0
MW-1	1.0	<1.0
MW-2	1.0	<1.0
MW-3	1.0	<1.0

PQL= Practical Quantitation Limit

Reviewed by:

Sarah Hallock
Quality Assurance Officer

Green Mountain Laboratories, Inc.

27 Cross Road
Middlesex, Vermont 05602
Phone (802) 223-1468 Fax (802) 223-8688
E-mail: GML@together.net

GML SAMPLE #

Page ____ of ____

GML # 4991

Client Name: BELL ENGINEERING
Address: 72 SCHOOL ST KEENE, NH 03431
Phone / Fax: 603 355 - 3392
Project Name: WEST BARNET STORE
Project Number: ~~96-120~~ 99-120
Project Manager: RONALD BELL
Sampler: RON BELL

Analysis Requested: 8021B; 8100 Modified

#	Sample Location	Date	Time	# of Cont.	Pres.	Sample Type	Remarks
1	~~PATCO~~ NASON	3-8-99	11:00	~~2~~	-	GRAB	
2	~~GML~~ STORE	"	11:15	3	-	"	
3	MW-1	"	12:00	3	-	"	
4	MW-2	"	12:15	3	-	"	
5	MW-3	"	12:30	3	-	"	

Chain of Custody

Relinquished By: Ronald Bell	Date/Time: 3/8/99 4:30	Received By:	Date/Time: 3/8/99 16:15
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Temperature Blank:	Vial Lot ID #:		

Appendix B

UST CLOSURE ASSESSMENT

BELL ENGINEERING
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UST CLOSURE ASSESSMENT

WEST BARNET GENERAL STORE
WEST BARNET, VT

1. General Site Information:

Site Name: West Barnet General Store, West Barnet, VT

UST Closure Date: 3-8-1999

UST's: Two (2) 500 gallon kerosene underground Storage Tanks

Owner: Mr. & Mrs. Ryan
West Barnet General Store
West Barnet, VT

Institution initiating UST removal:
The Merchants Bank
Burlington, Vermont

Consultant for the Merchants Bank:
Cay Consulting Company, Inc.
PO Box 2126
Brattleboro, VT 05303

UST Closure Assessment By:
Bell Engineering
72 School Street
Keene, NH 03431

UST Closure Contractor:
Caulking Excavating
PO Box 370
Danville, VT 05828

Waste Disposal Company:
North Country Environmental Services
11 Mill Street
Barre, VT 05641

2. Site Sketch:

A site sketch is presented in Figure 1. The site sketch indicates: relative locations of the UST's, neighboring properties, water supplies, surface water, expected groundwater flow direction, and general surface features.

3. Results of UST closure assessment:

3.1. UST #1

The 500 gallon fuel oil UST was pumped dry and cleaned prior to tank removal. Approximately 100 gallons of liquids and tank bottoms were removed from the UST. The waste products were stored in 55 gallon drums for pickup by North Country Environmental Services of 11 Mill Street, Barre, VT.

The tank was removed intact from the excavation. After removing soil from the tank it was observed that there were numerous holes in the tank ranging from small pin holes up to holes 1/2 inch in diameter.

The sidewalls and bottom of the excavation pit were screened with a Photoionization Detector (PID) calibrated just prior to use. The PID detected that Volatile Organic Compounds were present in the soils. Representative soils were obtained from the sidewalls and bottom of the pit and placed in a resealable plastic bag. The soils were allowed to heat up for approximately 5 minutes in a truck cab. The tip of the PID was inserted into the plastic bag and the following results obtained:

Side wall of excavation:	15 ppm
Bottom of excavation:	25 ppm
1.0 ft below bottom of excavation:	17 ppm

Groundwater quickly seeped into the excavation. The bottom of the excavation was approximately 5.0 feet below ground surface. Groundwater seeps were present an approximately 2.7 feet bgs. Due to the presence of groundwater, no soils were removed from the excavation. The soils at the bottom of the excavation were a silty clay. There was no free product floating on the groundwater.

3.2 UST #2

The UST was pumped dry and cleaned in place prior to removal. Approximately 200 gallons of liquid and tank bottoms were removed from the tank. The liquids in the tank appeared to be primarily water with a thin layer of petroleum products floating on the top.

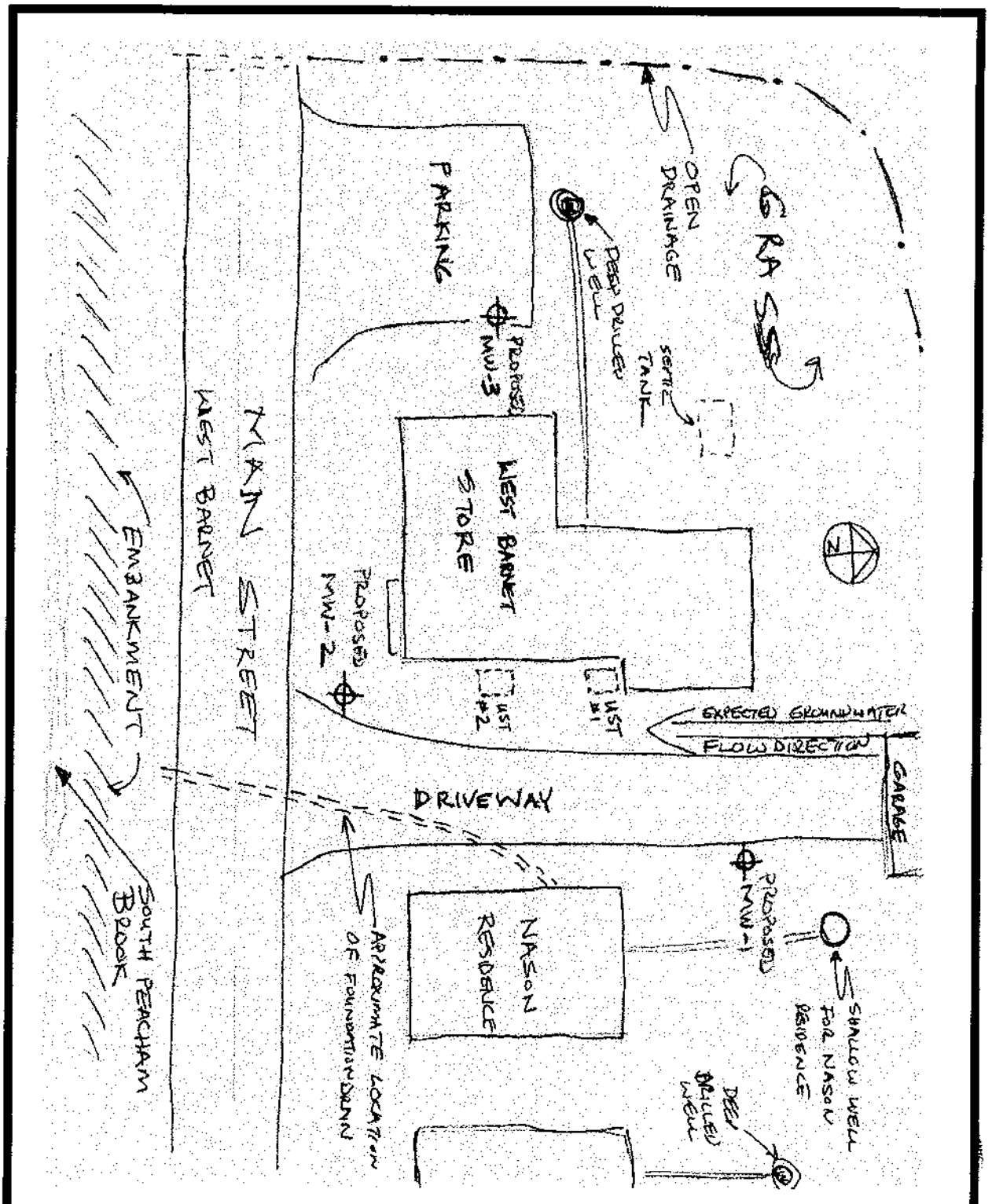

FIGURE 1: SITE SKETCH
WEST BARNET GENERAL STORE
WEST BARNET, VERMONT

BELL ENGINEERING
CIVIL & ENVIRONMENTAL
72 School Streeet Keene, NH

The liquids were drummed in 55 gallon drums for pick-up and disposal by North Country Environmental Services.

The tank was removed from the excavation pit and found to be in very poor condition. There were numerous holes in the bottom third of the tank. It is estimated that as much as 20 % of the bottom third of the tank was missing.

Screening of the excavation pit with a PID showed contamination to be present. Soil samples were taken from the sidewalls and bottom of the excavation and placed in reseable plastic bags following standard headspace sampling protocol. After allowing to warm up for approximately 5 minutes the tip of the PID was inserted into the bags and the following results recorded:

Sidewall of the excavation:	22 ppm
Bottom of the excavation:	52 ppm
1.0 ft below bottom of excavation:	18 ppm

Due to a high groundwater table it was not possible to remove soils from the excavation. Seeps were present at approximately 2.5 ft bgs and the excavation pit soon filled up with groundwater. The soils at the bottom of the pit were a silty clay.
There was no free product floating on the groundwater.

4.0 Sensitive Receptors

As shown on the site sketch the neighboring property to the west has a shallow well located approximately 60 feet from UST #2. This shallow well is expected to be hydraulically upgradient form the UST locations. The shallow well is owned by Mr. Edwin Nason, RR1 Box 243, Barnet, Vt 05821, (802) 633-4411.

The well on the subject property is located approximately 100 feet from the UST's in a side gradient location. The well is a driven well cased into bedrock.

The groundwater flow direction is expected to be directly towards the South Peacham Brook which is located approximately 100 feet from the former UST locations.

The neighboring residence to the south west of the subject property owned by Ms. Miriam Hatch (802) 633-2850 has a shallow well located just to the east of the house. This well is approximately 150 feet to the west of the former UST location. The shallow well is expected to be side gradient from the subject property. The open drainage ditch located to the west of the subject property is expected to act as a hydraulic barrier.

5.0 Recommendations

It is recommended that three groundwater monitoring wells be installed to evaluate the groundwater quality and to verify the groundwater flow direction. During installation of the groundwater monitoring wells, soil samples from the boreholes are to be screened with a PID to determine if there is soil contamination. After installation of the monitoring wells, the wells should be allowed to develop for 3 to 5 days and then groundwater samples taken after bailing 5 well volumes. The groundwater samples should be analyzed for VOC's via EPA Method 8020.

Additionally, it is recommended that a water sample be obtained from the well for the West Barnet General Store and from the Nason residence. The well water samples should be sampled for VOC's via EPA Method 8020.

The basement of the West Barnet General Store should be screened with a PID to determine if VOC vapors are present. It is important to screen along the east side of the basement closest to the former tank location.

The results of the investigation should be summarized in a report format and submitted to the Hazardous Materials Division, Sites Management Section for review. The investigation report should summarize the groundwater laboratory data, indicate the groundwater flow direction, and provide a site map showing all potential sensitive receptors. The report should provide a summary and conclusions based on the results of the investigation.